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GENERAL AND COMPLETE DISARMAMENT: NOTIFICATION OF NUCLEAR TESTS

Note by the Secretary-General

Pursuant to General Assembly resolutions 41/59 N of 3 December 1986 and 42/38 C of 30 November 1987, a communication, dated 10 January 1994, has been received from Australia and is reproduced in the annex to the present note.

* A/49/50.

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ANNEX

Information provided by States

AUSTRALIA

[Original: English]

[10 January 1994]

1. The Permanent Mission of Australia has the honour to refer to General Assembly resolution 42/38 C, entitled "Notification of nuclear tests", in paragraph 3 of which the Assembly requests States that, while not themselves conducting nuclear explosions, possess data on such events to make those data available to the Secretary-General for circulation.

2. In accordance with that request, the Permanent Mission of Australia attaches details of nuclear explosions detected by Australia from July to September 1993 (see appendix I), as well as an explanatory memorandum (see appendix II).

APPENDIX I

Quarterly report on presumed underground nuclear explosions a/

July-September 1993

Month 1993	Day	Universal time h m	Locality	Estimated body-wave magnitude b/	Estimated yield kilotonnes c/	Sequence number
July			Nil			
August			Nil			
September			Nil			

a/ Information in this bulletin was derived from Australian seismological facilities and from institutions in other countries cooperating in the monitoring of earthquakes and nuclear explosions.

b/ Unless otherwise noted, the estimated body-wave magnitude is that published by the United States National Earthquake Information Center and is based on observations of magnitude obtained from around the world, including from Australia.

c/ The yields are estimated using empirical equations, but there is no single agreed formula for the determination of yields. The yields estimated from these relations are not sufficiently accurate to determine compliance with international treaties.

APPENDIX II

Explanatory note

When a nuclear device is detonated underground, seismic waves radiate out in all directions. In order to establish that an underground nuclear explosion has taken place, pinpoint its location and estimate the size or yield of the blast, seismologists attempt to detect and analyse the several distinct types of seismic waves generated by the blast. Many factors affect the strength and clarity of the seismic waves, particularly the efficiency with which the explosion transmits energy to the surrounding earth. That efficiency is, in turn, dependent on local geological conditions such as the hardness and water content of the rock surrounding the explosion. Knowledge of the path through the Earth which the seismic signals have travelled is also important. An international network of seismic stations would add significantly to confidence in the ability to detect and locate the source of underground nuclear explosions, whenever conducted. Australia is actively engaged in the international effort to create such a network and, in addition, has established a number of bilateral links for seismic cooperation. Experts estimate that confidence in an international seismic network would extend to coupled explosions with yields down to about 5 kilotonnes and possibly as low as 1 kilotonne; beyond this, distinguishing nuclear explosions from earthquakes and other seismic "noise" becomes a more difficult task and supplementary measures may be necessary. Estimating the yields of an underground explosion by remote seismic means is especially difficult on the basis of available data. The relationship between seismic signals and yield is not fixed, but is subject to the vagaries of geology and a number of other unknown factors. At the present time we do not have openly available the large and authoritative database of explosions of known yield in various locations and geological conditions necessary to define the relationship with maximum confidence. This is why the footnotes to the tables in the present report stress that the estimated yields are not sufficiently reliable to determine compliance with international treaties. All these questions are being actively addressed in international forums.